RFP 2013-002
City of Stockbridge, Georgia
City Hall-Municipal Court Fiber Interconnection

Sealed proposals marked "RFP 2013-002 City Hall-Municipal Court Fiber Interconnection" shall be received by the Purchasing Agent, City of Stockbridge, 4640 North Henry Blvd., Stockbridge, GA 30281, until 4:00 p.m., Friday, February 8, 2013. Respondents shall furnish all of the services described below.

I. OVERVIEW AND PROCEDURES

A. Introduction

The City of Stockbridge is accepting proposals to to install fiber optic cable to interconnect City Hall with its Municipal Court building. Vendor's summited RFQ quotes must be fixed price. No change orders will be allowed as it pertains to this specific RFQ request.

B. RFP Timetable

Issue date of RFP – January 17, 2013

Proposal due date – February 8, 2013 at 4:00 pm

Proposed contract start date – March 1, 2013

C. General Information

The respondent shall abide by General Instructions and Requirements as included as part of the RFP documents. Additionally, the respondent shall agree to the following:

1. Submission of proposal documents (one original and three copies) shall be the responsibility of the responding individual or firm. Failure of the respondent to provide any information requested in the RFP may result in rejection of the proposal. Material submitted regarding the RFP becomes the property of the City and shall only be

returned to the respondent at the City's option. Responses may be reviewed by any person after final selection and award have been made.

2. The City shall not reimburse any respondent for costs associated with the preparation, submission, or requested clarification of any proposal.

3. The City reserves the right to request clarification of information from any respondent. The City also reserves the right to waive minor irregularities in proposals, or to reject any and all proposals when to do so is in the best interest of the City of Stockbridge.

4. Requests for technical information shall be directed in writing to Vanessa Clark, Purchasing Agent, Email vclark@cityofstockbridge-ga.gov, Phone (770) 389-7900, Fax (770) 389-7912. No other communication with any other city employee is permitted.

5. Requests for contractual matters should be directed to Bill Linkous, City Attorney, Email blinkous@fmglaw.com, Phone (770) 818-1282, Fax (770) 937-9960.

6. The anticipated contract period is March 1, 2013 through completion of construction project, unless cancelled by either party, giving the other party thirty (30) days written notice.

II. EVALUATION/SELECTION PROCESS

A. Right to Reject

The City of Stockbridge retains the right to reject any or all proposals and to re-solicit if deemed to be in the best interest of the City of Stockbridge.

B. RFP Review Process

The City of Stockbridge will review responses to this RFP that meet the requirements enumerated and are received prior to the designated closing time and date.

Evaluation Criteria to be used to determine the qualified performance proposals are:

1. Vendor Qualifications

2. References

3. Has the vendor submitted all requested information requested in the RFP

4. Has the vendor properly completed all the required forms

Upon determination of qualified proposing suppliers, the selection committee will rank the proposals. If determined necessary, a formal interview may be requested and each highest ranked proposing supplier will be asked to make an oral presentation for further evaluation. The highest-ranked proposing supplier based on the oral presentation will then be chosen by the Committee. The Committee may then choose the highest ranked proposing supplier with which to begin negotiations.

If the City is unable, after good faith efforts, to negotiate a satisfactory contract with the highest-ranked proposing supplier, the entity shall formally end negotiations with that proposing supplier, and begin negotiations with the second-highest ranked proposing supplier.

C. RFP Not Contractual

Nothing contained in this RFP shall create any contractual relationship between the proposer and the City. The City accepts no financial responsibility for costs incurred by any proposer regarding this RFP.

III. SCOPE OF SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. In general, you shall provide labeling for the following items (As applicable):
   1. Riser cables at each room entrance /exit and at each termination location
   2. Fiber Enclosures and ports
   3. Cable at rear of Fiber Enclosure
   4. Cables at Manholes / Hand-holes

B. Provide all labeling and as-built documents per ANSI/EIA/TIA-606 recommendations and requirements. See drawings for additional details on labeling structure.

1.2 SUBMITTALS

A. Submit in compliance with General Requirements.

B. Provide the following submittals for approval:
   1. Fiber enclosure labeling example
   2. Labeling product data.
   3. Product samples.

Products

1.3 GENERAL

A. All labels shall be vinyl with adhesive backing for permanent attachment. Exterior cables will be labeled with exterior grade labeling, machine generated.

B. All labels shall be of sufficient size. Minimum sizes shall be as follows:
   1. 1-½ inch W x 3/8 inch H for:
      Fiber optic Cables
   2. 2-inch W x 1-inch H for:
      a. Fiber cables at Manholes/Hand Holes
      b. Fiber Enclosure
      c. Existing and Installed Conduit

1.4 SOFTWARE PROGRAM/MECHANICAL LABELER

A. An approved software program or mechanical labeler shall be used for the creation of all labels.

1. Approved Brands
   1 Dymo
   2. Panduit
   3. Brother
   4. Or Mechanical Equivalent Labelers

1.5 TEMPORARY LABELS

A. Vinyl labels, hand written, with permanent marker.

Execution

1.6 GENERAL

A. The Owner's labeling system to be used for all plates, cables, equipment and racks. The labeling system key shall be furnished by the Owner to match all existing cabling.

B. Provide and generate all labeling per ANSI/EIA/TIA-606. No labels will be furnished by the Owner.

C. Labels shall be developed and printed using an approved labeler.

D. Software program and all in-puts shall be turned over to the Owner at the end of the Project.

E. All final labeling shall reference the building and room name where the end point of the fiber cables terminate. IE-Municipal Court Room 100=MC.RM100

1.7 INSTALLATION

A. All labels shall be installed straight.

B. Provide labels at locations as indicated on the drawings and as follows:
   1. Port at rear of patch panel
   2. Port on front of patch panel
   3. Individual fiber strands at front and rear of patch panel – label single mode or multimode

1.8 TEMPORARY LABELS

A. Provide temporary labels on all outlet cable as they are roughed-in.

1.9 TEXT SIZE AND INFORMATION

A. Text size should be as large and as bold as possible.

B. Exact text required information will be provided by customer at time of termination.

C. All riser cables labels shall contain:
   1. "To" and "From" information.
   2. Termination Building and Room numbers.

1.10 LABELING REFERENCE SPREAD SHEETS

A. Contractor to provide a labeling and terminating reference chart(s) in an MS Excel program spread sheet indicating the following:
   1. “To” and “From” Points for all OSP Fiber Cables
   2. “To” and “From” fiber riser Cables at the MDF Server Room and TR.
   3. Riser and termination information as directed by the owner. Labeling should make it easy for Customer Personnel to determine the end termination points of all fiber cables.

1.11 FLOOR PLAN AS BUILT

A. (If required for end termination points within buildings.) Provide a full-size AutoCAD generated as-built floor plan indicating the route of the new fiber cable from the building entry point to the final termination point at the server closet or Telco room (TR). Customer shall supply current copy of floor plan for each building to be marked up by contractor at completion of project.

B. Provide a complete set of cabling system as-built using AutoCAD and turn over to the Owner at Final Acceptance.

END OF
SECTION

TESTING, CERTIFICATION AND WARRANTY PART 1 - GENERAL

1.1 SUMMARY

A. The following systems or cabling shall be tested after the installation is fully completed:
   1. Fiber optic backbone cabling.

1.2 SUBMITTALS

A. Submit in compliance with General Requirements. Include the following.

B. Submit product data of test equipment to be used.

C. Submit sample of reports that will be generated to document test and performance.

D. Submit a document detailing proposed test methods, steps, and sequence of operation.

1.3 PRE-INSTALLATION INSPECTION

A. Visually inspect all cables, cable reels and shipping cartons to detect possible cable damage incurred during shipping and transport. Visibly damaged goods are to be returned to the supplier and replaced at no additional cost to Owner.

B. If post-manufacture performance data has been supplied by the manufacturer or connecting hardware, copies of such data are to be kept for inclusion in the documentation and made available to the Owner upon request.

C. All materials are to be new and unused.

1.4 POST-INSTALLATION TEST AND CERTIFICATION

A. Contractor Requirements
   1. Contractor shall provide sufficient skilled labor to complete testing within the agreed upon test period. Testing shall commence no later than two weeks prior to each floors turnover date and shall be completed no later than four weeks after substantial completion of each project phase.
   2. Contractor shall have a minimum of three years' experience installing and testing fiber optic cabling systems. All installers assigned by the Contractor to the installation shall have a minimum of two years' experience in the installation of fiber optic cabling systems.
   3. Contractor is responsible for supplying all of the required test equipment used to conduct acceptance tests.

4. Contractor is responsible for submitting acceptance documentation as defined in 1.4 of this Section.

B. Documentation

1. Test reports may be submitted in hardcopy and/or electronic format. Handwritten test reports are not acceptable.
2. Hardcopy reports are to be submitted in labeled three-ring binders with a witness signature verifying passing execution of all tests.
3. Electronic reports are to be submitted on CD. CD shall contain the software required to view test results. Electronic reports must be accompanied by a certificate signed by an authorized representative of the Contractor warranting the truth and accuracy of the electronic report. Certificate must reference traceable circuit numbers that match the electronic record.
4. Test reports shall include the following information for each cabling element tested:
    a. Actual measured and maximum allowable attenuation (loss) at the specified wavelengths per this Section and the margin. An individual test that fails the link criteria shall be marked as FAIL.
    b. Reference method.
    c. Number of mated connectors and number of splices (if any).
    d. Actual length and maximum allowable length per this Section. Any individual test that fails the link length criteria shall be marked as FAIL.
    e. For fiber, Group refractive index (GRI) for the type of fiber tested, if length was optically measured.
    f. Tester manufacturer, model, serial number and software version.
    g. Circuit ID number and project/job name.
    h. Link criteria (Auto test) used.
    i. Overall pass/fail indication.
    j. Date and time of test.
5. Test reports shall be submitted within seven business days of completion of testing.

C. Test Equipment

1. Test equipment used under this contract shall be from manufacturers who have a minimum of five years' experience in producing field test equipment. Manufacturers must be ISO 9001 certified.
2. All test tools of a given type shall be from the same manufacturer and have compatible electronic results output.
3. Test equipment shall not include the loss or length of the test jumpers in the cable plant measurements.
4. Sources and meters shall automatically synchronize wavelengths to prevent calibration-related errors.
5. Test equipment shall store at least 100 tests in internal memory.
6. Test equipment shall employ a serial port to facilitate uploading of saved information from tester to PC.
7. The time-of-flight methodology shall be employed when optically measuring fiber length.
8. Test equipment capable of measuring a Tx/Rx fiber pair simultaneously is recommended to enhance productivity.
9. It is recommended that test equipment utilizing dual function main and remote units be used for bi-directional testing, eliminating the need to swap optical source and power meter.

1.5 REFERENCES AND STANDARDS

A. ANSI/TIA-568-C.0 (Feb 2009) Generic Telecommunications Cabling for Customer Premises

B. ANSI/TIA-568-C.1 (Feb 2009) Commercial Building Telecommunications Cabling Standard

C. ANSI/TIA-568-C.3 (June 2008) Optical Fiber Cabling Components Standard

D. ANSI/TIA/EIA-455-61 (2000) FOTP-61 Measurement of Fiber or Cable Attenuation

E. ANSI/TIA/EIA-455-171 (2001) FOTP-171 Attenuation by Substitution Measurement for Short Length Multimode and Graded Index and Single mode Optical Fiber Cable Assemblies

F. ANSI/TIA/EIA-526 (1992) Standard Test Procedures for Fiber Optic Systems

G. ANSI/TIA/EIA-526-7 (1998) OFSTP-7 Measurement of Optical Power Loss of Installed Single mode Fiber Cable Plant

H. ANSI/TIA/EIA-526-14A (1998) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant

I. ANSI/TIA/EIA-604-5-A (2001) FOCSI-5 Fiber Optic Connector Intermateability Standard, Type MPO

J. ANSI/TIA/EIA-758 (1999) Customer-Owned Outside Plant Telecommunications Cabling Standard

K. ANSI/TIA/EIA-492CAAA-1998 Detailed Specification for Class IVa Dispersion-Unshifted Single-mode Optical Fibers

L. ANSI/TIA/EIA-492AAAB-1998 Detailed Specification for 50 micron Core Diameter/125 micron Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers

M. ANSI/TIA/EIA-604-3 (1997) Fiber Optic Connector Intermateability Standard, FOCIS-3 (SC Compatible)

N. ASTM D4-566-90, Sec.18, Standard Test Methods for Electrical Performance Properties of Insulations and Jackets for Telecommunications Wire and Cable.

O. IEEE P802.3an, 10GBaseT Standard

P. BICSI – TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual, 10th Edition.

Q. Test equipment instructions, recommendations and guidelines.

R. National Electrical Code, current edition

S. Identification and administration work specified herein shall comply with the applicable requirements of:
   1. ANSI/TIA/EIA – 606 Administration Standards.
   2. ANSI/TIA/EIA – 569B Pathway and Spaces
   3. ANSI/TIA/EIA – 568C Telecommunications Cabling Standard.

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CABLE TESTERS

A. Multimode Optical Fiber Light Source
   1. Provide 850nm and 1300nm +/- 20 nm wavelength LED light sources
   2. Spectral width of sources shall be </= 50nm for 850nm wavelengths and </= 140nm for 1300nm wavelengths.
   3. The output of the light source shall be 8 MW for 62.5um core optical fiber
   4. Output Stability +/- 0.40 dB from 0 to 50 degrees C
   5. Long Term output stability +/- 0.10dB at 25 degrees C
   6. Power shall be from rechargeable Ni-Cad batteries
   7. Connector types shall include: SMA, FC, LC, ST and SC
   8. Design make:
   9. Acceptable Manufacturers: Fluke, and Corning.

B. Single Mode Optical Fiber Light Source
   1. Provide 1310nm and 1550nm +/- 20 nm wavelength Laser light sources
   2. Output Stability +/- 0.40 dB from 0 to 50 degrees C
   3. Long Term output stability +/- 0.10dB at 25 degrees C
   4. Power shall be from rechargeable Ni-Cad batteries
   5. Connector types shall include: SMA, FC, LC, ST and SC
   6. Acceptable Manufacturers: Fluke, Amp, Wave Tek.

C. Power Meter
   1. Provide 850nm, 1300nm, 1310nm and 1550nm +/- 20 nm wavelength test capability
   2. Measurement range shall be from 10 to -60 dBm
   3. Accuracy shall be +/- 5% at 0 to -50dBm and +/- 10% 10 to 0dBm and -50 to-60 dBm.
   4. Resolution shall be 0.1 dB
   5. Connector types shall include: SMA, FC, LC, ST and SC
   6. Acceptable Manufacturers: Fluke, Amp.

D. Optical Time Domain Reflectometer (OTDR): Front CRT display. Connector types shall include: LC, SMA, FC, ST, bionic and SC

PART 3 - EXECUTION

3.1 OPTICAL FIBER CABLE TESTING

A. Test Process

1. Owner reserves the right to be present during any or all testing.
2. Testing shall be of the optical link. An optical fiber link is defined as the passive cabling network between two optical cross-connects (patch panels or outlets). This includes cable, connectors and splices but does not include active components. The link test contains the representative connector loss at the patch panel associated with the mating of patch cords but does not include the performance of the connector at the equipment interface.
3. All cabling not tested strictly in accordance with these procedures shall be re-tested at no additional cost to the Owner.
4. 100 percent of the installed cabling must be tested. All tests must pass acceptance criteria defined in 1.3 of this Section.
5. Either the test equipment shall be fully charged prior to each day's testing or a fresh set of batteries shall be brought to the job site.

B. Test all installed fibers with launch and far end cable of sufficient length for the test equipment to be able to see through all installed connectors.

C. Localized attenuation shall not exceed 0.5 dB at any point.

D. Standards Compliance and Test Requirements
1. Unless otherwise specified, multimode and single mode fiber cable must meet transmission performance parameters as specified in ANSI/TIA-568-C. Multimode fiber shall be laser optimized and have core/cladding dimensions of 50/125 micron. Single mode fiber shall be Class IVa dispersion-unshifted fiber.
2. Testing of Installed Multimode Fiber Cable
   a. Link attenuation shall be tested in accordance with ANSI/TIA/EIA-526-14A. Reference measurements shall be made in accordance with Method B or equivalent. Optical loss shall be measured on each fiber at 850 nm and 1,300 nm. Loss shall be measured on each fiber from each direction (bi-directional), unless it is known in advance which fibers shall transmit (Tx) and receive (Rx).
   b. Link length shall be optically measured or calculated using cable sheath length markings.
3. Testing of Installed Single Mode Fiber Cable
   a. Link attenuation shall be tested in accordance with ANSI/TIA/EIA 526-7 Method A. Reference measurements shall be made in accordance with Method A.1 or equivalent. Optical loss shall be measured on each fiber at 1310 nm and 1550 nm. Loss shall be measured on each fiber from each direction (bi-directional), unless it is known in advance which fibers shall transmit (Tx) and receive (Rx).
   b. Link length shall be optically measured or calculated using cable sheath length markings.

E. While it is difficult to generalize, here are some guidelines and the expected results:
1. For each connector, a loss figure of better than 0.5 dB (0.75 is the maximum allowed by the standards)
2. For each splice, expect a loss figure of better figure 0.1 dB (0.3 is the maximum allowed by the standards) *Only with engineers approval*
3. For multimode fiber, expect a loss figure of better than 3.0 dB per km @ 850nm (3.5 dB is the maximum allowed by the standards) and 1.0 dB per km @ 1300 nm (3.5 dB is the maximum allowed by the standards).

a. This roughly translates into a loss of 0.1 dB per 100 feet for 850 nm, 0.1 dB per 300 feet for 1300nm.

4. For single mode fiber, expect a loss figure of better than 0.5 dB per km @ 1310nm (1.0 dB is the maximum allowed by the standards) and 0.4 dB per km @ 1550nm (1.0 dB is the maximum allowed by the standards).
    a. This roughly translates into a loss of 0.1 dB per 600 feet @ 1310nm and 0.1 dB per 750 feet @ 1550 nm.
5. So for the loss of a cable plant, calculate the approximate loss as:
    a. (0.5 dB X # connectors) + (0.1 dB x # splices) + fiber loss on the total length of cable

F. Test results shall all be positive and favorable.

G. Successful Test/Certification
1. Contractor shall download results of the certification test unit measurements to a computer program. You shall tabulate individual test results. You shall analyze test results to assure cabling system meets end-to-end requirements. You shall sign and date each outlet/cable test, documenting a certified and tested Category 6 system.
2. If a problem or failed test occurs, the contractor shall evaluate and remedy the problem.
3. After a problem has been remedied, the contractor shall re-test circuit and analyze test results and certify. The Contractor is to continue this process until required results are achieved and all outlet cabling is 100% certified to ANSI/TIA-568-C. The Server Room cabling should be certified to IEEE P802.3an, TIA TSB-155, and TR24750 for 10GBASE-T over Category 6.
4. After all problems are remedied, forward all test results to the Owner. Provide test results in a bound hardcopy format and in an approved, tabulated computer format on disk.

3.2 ACCEPTANCE

A. Once all work has been completed, test documentation has been submitted, and Owner is satisfied that all work is in accordance with contract documents, the Owner shall notify Contractor in writing of formal acceptance of system.

B. Acceptance Requirements
1. Contractor must warrant in writing that 100 percent of the installation meets the requirements specified under 1.3 of this Section.
2. Owner reserves the right to conduct, using Contractor equipment and labor, a random re-test of up to 5 percent of the cable plant to confirm documented results. Any failing cabling shall be re-tested and restored to a passing condition. In the event more than 2 percent of the cable plant fails during re- test, the entire cable plant shall be re-tested and restored to a passing condition at no additional cost to the Owner.
3. Acceptance shall be subject to completion of all work, successful post-installation testing, which yields 100 percent PASS rating, and receipt of full documentation as described in 1.3 of this Section.

C. Warranty: Contractor shall warrant installation against all product defects, and that all approved cabling components meet or exceed the requirements of this document for a 25-year period.

END OF
SECTION

SECTION 27 13 02 - FIBER OPTIC BACKBONE

PART 1 - GENERAL

1.1 Summary

A. This Section includes the fiber backbone cable and the termination requirements for inter and intra building backbone cabling requirements. This Section includes minimum requirements for the following:
   1. Multi-mode and Single-mode optical fiber cables.
   2. Optical fiber connectors – Multi-mode and Single-mode.
   3. Fiber optic patch panels.

B. Fiber Optic riser cables shall originate at the City Hall Building and terminate at the Municipal Court Building. The proposed pathways as indicated on a site walk thru. Terminate both ends into F.O. Patch Panels using “LC” type connector/adaptor panels.

C. OSP Fiber Optic cable shall be 12 Strand 50 um OM3 exterior grade cable between buildings. Refer to aerial photographs.

1.2 QUALITY ASSURANCE

A. All cable shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the Contract Documents shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "approved equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.

B. Materials and work specified herein shall comply with the applicable requirements of:
   1. ANSI/TIA/EIA-568-C.1 (2009) Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
   2. ANSI/TIA/EIA-568-C.2 (2009) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
   3. ANSI/TIA/EIA-568-C.3 (2009) Optical Fiber Cabling Components Standard
   4. ANSI/TIA/EIA-455-61 (2000) FOTP-61 Measurement of Fiber or Cable Attenuation
   5. ANSI/TIA/EIA-455-171 (2001) FOTP-171 Attenuation by Substitution Measurement for Short Length Multimode and Graded Index and Single mode Optical Fiber Cable Assemblies
   6. ANSI/TIA/EIA-526 (1992) Standard Test Procedures for Fiber Optic Systems
   7. ANSI/TIA/EIA-526-7 (1998) OFSTP-7 Measurement of Optical Power Loss of Installed Single mode Fiber Cable Plant
   8. ANSI/TIA/EIA-526-14A (1998) OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant

9. ANSI/TIA/EIA-604-5-A (2001) FOCSI-5 Fiber Optic Connector Intermateability Standard, Type MPO
10. ANSI/TIA/EIA-758 (1999) Customer-Owned Outside Plant Telecommunications Cabling Standard
11. ANSI/TIA/EIA-492CAAA-1998 Detailed Specification for Class IVa Dispersion-Unshifted Single-mode Optical Fibers
12. ANSI/TIA/EIA-492AAAB-1998 Detailed Specification for 50 micron Core Diameter/125 micron Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers
13. ANSI/TIA/EIA-604-3 (1997) Fiber Optic Connector Intermateability Standard, FOCIS-3 (SC Compatible)
14. ANSI/EIA/TIA-569A (2000) Commercial Building Standard for Telecommunications Pathways and Spaces including Addendums A-1 through A-4
15. EIA/TIA-598-A (1995) Optical Fiber Color Coding
16. NFPA 70 (1996) National Electric Code
17. BICSI Telecommunications Distribution Methods Manual
18. ISO/IEC 11801 Information Technology-Generic Cabling for Customer Premises

1.3 SUBMITTALS

A. Submit in compliance with General Requirements. Include the following.
   1. Manufacturer's catalog data for all products.
   2. Sample of fiber optic cable.
   3. Sample of “LC" fiber optic connectors and adapter panels.

B. Statements
   1. Proposed method of installation of the fiber optic cable system.
   2. Proposed test plan.
   3. Factory Test Reports.
   4. Optical fiber (uncabled).
   5. Attenuation for each fiber.
   6. Bandwidth.
   7. Numerical aperture.
   8. Cladding Diameter
   9. Field Test Reports.
   10. Optical Fiber (uncabled).
   11. Fiber Optic Cable (reeled and installed).

C. Certificates
   1. Certificates of Compliance.
   2. Impact Resistance.
   3. Crush Resistance.
   4. Flexing or Bonding Cycles.
   5. Core Cladding Offset.
   6. Primary Protective Coating Diameter.
   7. Tensile Strength.
   8. Cable Minimum Bend Radius.

D. Certificates of Compliance
   1. Optical Fiber (uncabled).

2. Fiber Optic Cable.
3. Connectors
4.

PART 2 - PRODUCTS

2.1 OPTICAL FIBER CABLES

A. Indoor Outdoor Fiber Distribution Hybrid Cable
   1. Single-mode Fiber Cable
      a. Shall be plenum rated, interlocking armored, with nominal 9/125um-core/cladding diameters.
      b. Low water peak glass.
      c. Jacket color shall be yellow.
      d. The fiber shall comply with ANSI/EIA/TIA-492-CAAA.
   2. Multi-mode Fiber Cable
      a. Shall be graded-index optical fiber, plenum rated, interlocking armored, laser optimized for 10 gigabit with nominal 50/125um-core/cladding diameters.
      b. Jacket color shall be aqua.
      c. The fiber shall comply with ANSI/EIA/TIA-492-AAAB.
      d. The fiber shall meet or exceed the proposed OM3 standard.
   3. Design Make: General Cable Part No. AP0xx/BL0xx1PNU-ILRAS where xx denotes the fiber count. Refer to riser schedule for strand count.
   4. Approved Manufacturers: General Cable, Corning, Belden.
   5.

2.2 FIBER OPTIC ENCLOSURE AND CONNECTOR PANELS

A. Fiber optic patch panels shall meet the following specifications:
   1. Meet or exceed all EIA/TIA-568B requirements.
   2. Provide connector panels with (6) duplex LC connectors in each to terminate FO cable.
   3. 19-inch rack mounted unless otherwise specified.
   4. Provide quantity needed to terminate all FO riser cables.
   5. Provide blank adaptor panel covers over spare slots.

B. Design Make:
   1. Enclosure:
      a. 1RU Panduit FCE1U
      b. 2RU Panduit FCE2U
   2. Connector Panels:
      a. Multimode: Panduit FAP6WAQDLCZ
      b. Single mode: Panduit FAP6WBUDLCZ
   3. Blank Panels: FAPB

C. Acceptable Manufacturers: Panduit, Corning, Belden.

PART 3 - EXECUTION

3.1 GENERAL

A. Cable construction work shall be performed by construction personnel who have had at least 3 years' experience in placing cables in conduit, cable trays, and underground duct systems.

B. Fiber optic cable, terminations and testing shall be made by technicians who have had a minimum of two years' experience in splicing and terminating and one year in testing fiber optic cables.

C. The Drawings show the general location of the cables and equipment to be placed. The Contractor shall be responsible for surveying the installation to determine obstacles to installation and the exact locations for cables and equipment to be installed. Any conditions that would preclude installation of cables and equipment in the location shown on the contract drawings shall be immediately reported to the Owner's Representative.

D. Adequate care shall be exercised when handling and storing reels of cable to prevent damage to the cable. Cable with dents, flat spots, or other sheath distortions shall not be installed.

E. Securing Cable: Immediately after cable placement, a permanent identification tag shall be attached to visible cable sections. The cables shall be checked to ensure that the marking are intact.
   1. Cables and equipment shall be supported and secured as shown on the contract drawings. Where the specific method of support is not shown, adequate supports and fasteners shall be used to secure cables and equipment in position. Metallic supports and fasteners shall have a corrosion resistant finish.
   2. Clamps and cable ties shall be used as necessary to properly secure the cable.

F. Bending: Caution shall be used when bending cable to avoid kinks or other damage to the sheath. The bend radius shall be as large a possible with a minimum of 10 inches. Minimum radius shall be increased when necessary to meet cable manufacturer's recommendation.

G. Pulling: Pulling lines shall be attached to both cable ends when cable is destined for bi-directional pull, and fitted with factory-installed pulling eyes. Cables not equipped with a pulling eye shall have the pulling line attached to the cable ends by means of cable grip, installed as shown. Cable reels shall be located and aligned so that the cable is pulled out from the top of the reel. Cable shall not be pulled from the bottom of the reel.

H. Lubricant: Adequate pulling lubricant shall be used to minimize pulling tension and prevent sheath damage when pulling cables into ducts and conduits. Lubricant shall be applied to the cable sheath with a lubricator. When pulling has been completed, the exposed cable ends shall be wiped clean of lubricant. All lubricant spills shall be cleaned up immediately. Lubricants shall be certified by the lubricant manufacturer to be compatible with and intended for use with plastic-sheathed cables. Soap and grease type lubricants are prohibited.

I. Damage and Defects: It shall be the Contractor's responsibility to ensure, by means of a tension monitoring device, that the cable pulling procedures being used

do not exceed the maximum pulling tension as specified by cable manufacturer. The cable shall be carefully inspected for sheath defects or other irregularities as it is payed out from the reel. If defects are detected, pulling shall stop immediately and the cable section shall be repaired or replaced at the discretion of the Owner's Representative. A system of communications, visual or otherwise, shall be maintained between pulling and feed locations so that pulling can be stopped instantly, if necessary.

J. Duct Seal: Innerduct in which cable is placed shall be sealed with urethane foam duct seal to prevent damage to the cable sheath and to prevent the entrance of dirt or water into the inner duct. All unused innerduct shall be sealed at both ends by using inner duct plastic end cap immediately following installation.

3.2 OPTICAL FIBER CABLES

A. Maintain polarization for entire system as described in ANSI/EIA/TIA-568-B, section 10.3.2.

B. Install patch panels as indicated on the plans in each TR. Install F.O. connector plates in each patch panel and terminate fiber optic cable onto connectors. Polish fiber optic terminations per the manufacturer’s recommendations to meet TIA/EIA- 568-B.3.

C. Cable shall be continuous from patch panel to patch panel. Splices are not allowed.

D. Verify service loop size and location prior to installation with the Project Engineer

E. At each TR, leave a 15' service loop at each location. Service loops shall be neatly coiled and attached to the cable rack tray.

F. Adhere to all manufacturers’ requirements regarding pulling tension and allowable lubricants.

G. The Contractor shall be responsible for verifying the actual footage’s and distances identified on the drawings.

H. Install fiber optic cables through the designated floor sleeves or block-outs as indicated on the drawings. Provide labeling every 10’ along the entire cable route.

I. The Contractor shall be responsible for verifying that conduits and raceways are "ready for occupancy" before cable placement.

J. The Contractor shall assume the responsibility for any difficulties or damage to the cable during placement.

K. Where fiber optic cable passes through a vertical riser, secure fiber to cable rack tray wall vertically every 12" and label at 5’-0” AFF on each floor.

3.3 FIELD INSTALLED CONNECTORS

A. General

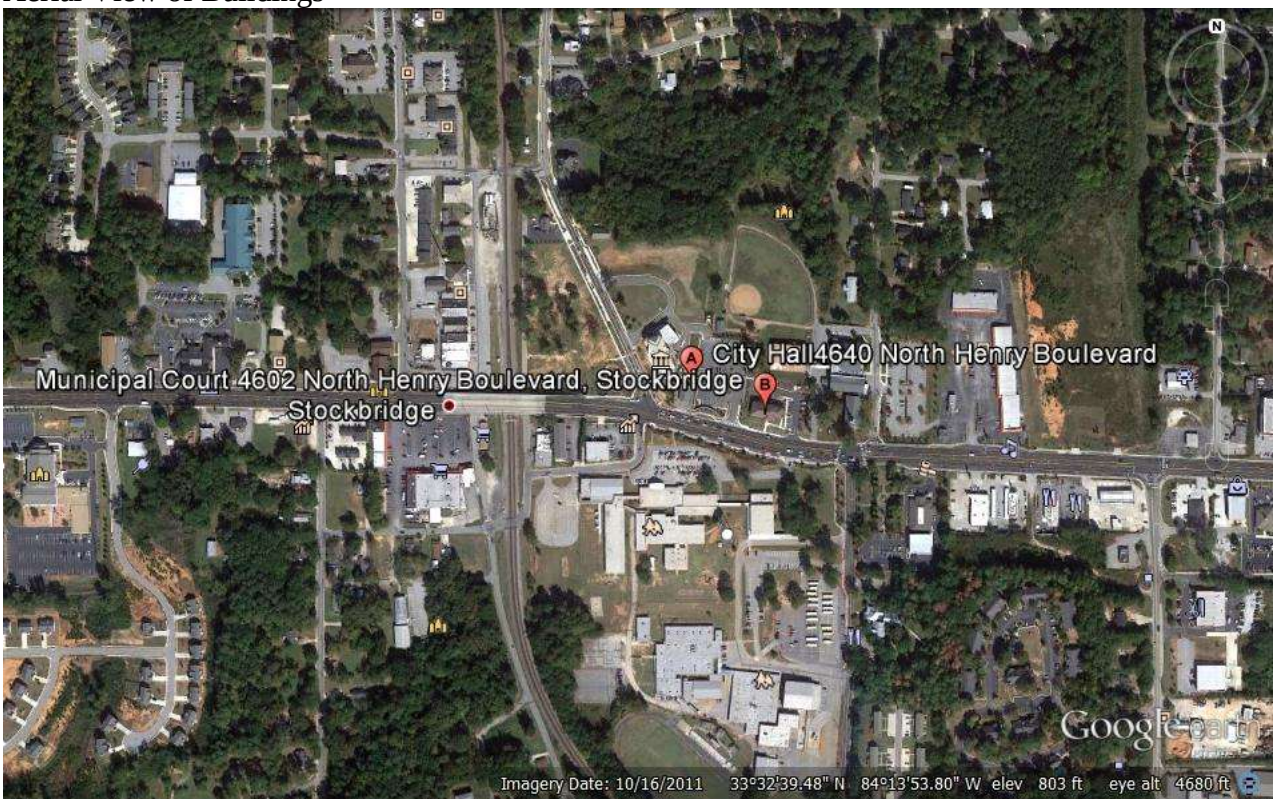
1. The Contractor shall provide “LC” type connectors for all fiber optic cables. The completed cable assembly shall interface with the fiber optic terminal bulkhead feed-through receptacle on the Fiber Optic Patch Panel (FOPP). Contractor shall supply and install dust caps for all terminated fibers.
2. The contractor shall follow manufacturer’s instructions for installing each connector.
3. The contractor shall leave a minimum of 3'-0" (or manufacturers specification) of slack of each strand coiled carefully in the FOPP.
4. The connector/cable interface to the completed cable assembly shall be able to withstand tensile force of 25 pounds without detrimental effects on the connector loss characteristics.
5. Each connector half shall exhibit an insertion loss of 0.3 dB or less and return loss of -30 dB or better.

B. Test Plan
1. Contractor shall submit for approval a test plan showing when and how each system will be tested 30 days in advance of actual testing. The plan shall include a procedure itemized to the extent that will permit recording the tested parameters including space for sign-off witnessed by the Owner's Representative.
2. The test plan shall be submitted to the Owner's Representative for approval prior to the start of testing.

C. Testing
1. Testing of multimode and single mode fiber shall be in accordance with “Testing, Certification and Warranty”
2. The overall db loss of each FO strand from connector to connector shall not exceed 1.5 db of loss.
3. Test each strand in both directions using a Fluke OTDR. Measure the loss and provide the test results to the Engineer and Owner for approval.

END OF SECTION

Aerial View of Buildings



Proposal Request-Option 1-Aerial Placement of Cable

The City of Stockbridge is requesting vendor to quote the installation of a 12 strand 50 micron MM *Aerial* fiber from the 2nd floor MDF at City Hall located on 4640 North Henry Boulevard, Stockbridge Georgia to the 2nd Floor MDF at Municipal Court located on 4602 North Henry Boulevard, Stockbridge Georgia.
All fiber must be terminated, tested and labeled with LC type multi-mode fiber ends. The suggested route for installation is the telephone poles located in front and across the street from City Hall and Municipal buildings. However, vendors are welcome to submit what they believe to best route when responding to RFQ. All submitted quotes must include all materials needed to complete RFQ project. This includes but not limited to conduit, fiber enclosures, fiber patch cords, fiber couplers, labels, sleeves, penetrations and etc.

Proposal Request-Option 2-Underground Placement of Cable

The City of Stockbridge is requesting vendor to quote the installation of a 12 strand 50 micron MM *Underground* fiber from the 2nd floor MDF at City Hall located on 4640 North Henry Boulevard, Stockbridge Georgia to the 2nd Floor MDF at Municipal Court located on 4602 North Henry Boulevard, Stockbridge Georgia.
All fiber must be terminated, tested and labeled with LC type multi-mode fiber ends. The suggested route for installation is across the parking lot from one building to the other. However, vendors are welcome to submit what they believe to best route when responding to RFQ. All submitted quotes must include all materials needed to complete RFQ project. This includes but not limited to conduit, fiber enclosures, fiber patch cords, fiber couplers, labels, sleeves, penetrations and etc.